Cost of biologics in patients suffering from Psoriasis in Greece: a retrospective longitudinal cohort study

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INTRODUCTION

Discontinuation or switching of biologic treatment among patients with psoriasis imposes a great economic burden.

OBJECTIVE

This study evaluates the cost of biologic treatments for psoriasis (PsO) patients in Greece, focusing on bio-naïve and bio-experienced populations.

METHODS

Study design: observational, retrospective, longitudinal cohort study

Patients: patients with PsO under biologics in Greece, with 2 years of follow-up after Jan 1, 2016, without other autoimmune diseases (e.g., Crohn's disease, rheumatoid arthritis), except for psoriatic arthritis (PsA).

Data extraction: all prescriptions issued through **national prescription system** (IDIKA S.A) from Jan 1, 2015, to Dec 31, 2020, under

- ICD-10 codes of L40.0-L40.4, L40.8, L40.9, and
- ATC code of the biologics: infliximab, adalimumab, etanercept, secukinumab, ustekinumab, brodalumab, certolizumab pegol.

Setting

- Each treatment line consisted of multiple prescriptions. Treatment gaps≤90 days were considered a **grace period**. Gaps>90 days without prescription renewal indicated treatment discontinuation. A treatment line also ended upon switching to a different biologic agent.
- Treatment lines starting in 2015 were excluded. The index claim was defined as the first claim of the initial treatment line initiated after January 1, 2016, with the respective drug being the index drug. The index date (starting in 2016 or later) required a 2-year follow-up (FU) period within the data capturing period. (Fig.1)

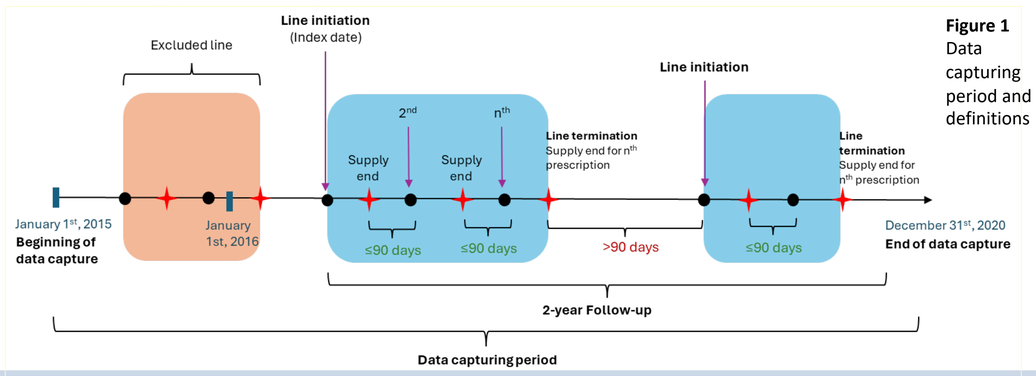


Figure 1 Data capturing period and definitions

Definitions

Patients initiated new biologic treatments as either **biologic naïve** (no claims during 2015) or biologic experienced (with claims during 2015).

- **Persistent Patients:** Remained on their index drug during the follow-up period without gaps>90 days.
- **Discontinuers until FU end**: Stopped the index treatment and did receive no other treatment during the remaining follow-up period.
- **Switchers**: Switched to a different treatment.
- **Restarters**: Restarted the index treatment after a gap>90 days.

Cost per patient estimation

- The cost was the total medication packages dispensed during follow-up, multiplied by the invoice price.
- The hospital price was 91.26% of the ex-factory price, reduced by 5% for the invoice price (Price list bulletin, February 2024).

Statistical analysis

- Costs were shown with means and 95% CIs.
- Differences in costs across drugs were assessed with the Kruskal-Wallis' test, and Dunn's Pairwise Comparison with Bonferroni adjustment was applied for $p < 0.05$. (STATA 17.0)

RESULTS

Patient characteristics

- 5,511 patients were eligible; **3,830 were bio-naïve** and **1,681 bio-experienced**.
- The mean age of bio-naïve and bio-experienced patients was 49.7 years (SD: 14.6), and 51.9 years (14.5), respectively.
- Most patients were male (63%) and had only a PsO diagnosis (82%)
- 66% and 65% in bio-naïve and bio-experienced cohorts, respectively, had at least one comorbidity, with neurological disorders the most frequent one (40% and 45%, respectively; Fig. 2).

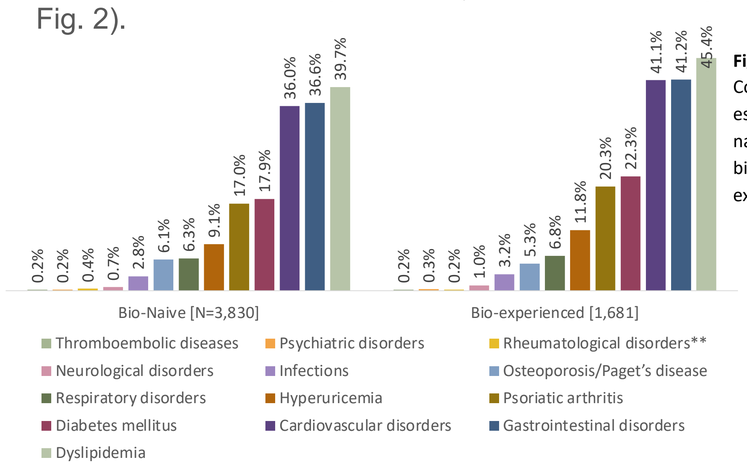


Figure 2 Comorbidities in bio-naïve and bio-experienced

Treatment

- **61% and 54%** of the bio-naïve and the bio-experienced cohorts, respectively, **were persistent to the index drug** after 1-year FU (Fig. 3).

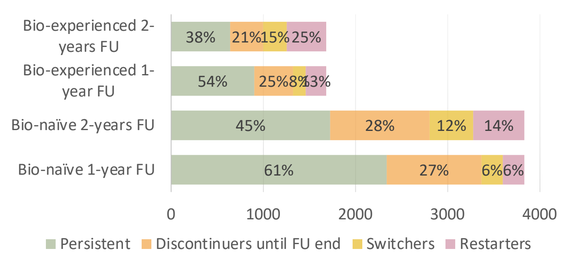
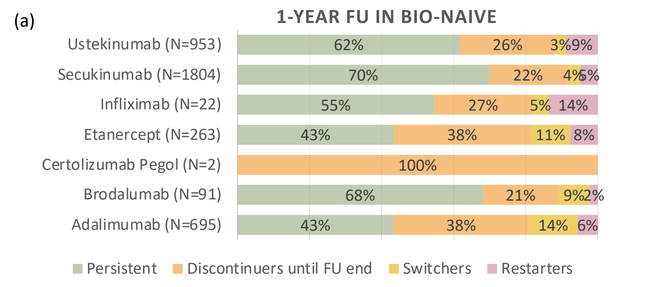


Figure 3 Persistent patients, discontinuers until FU end, switchers and restarters at 1- and 2-years of FU

- At 1-year FU, the percentage of persistent patients was higher among those treated with Secukinumab (70% in bio-naïve; 72% in bio-experienced) or Brodalumab (68% in bio-naïve; 64% in bio-experienced) (Fig. 4),
- Brodalumab and Secukinumab had the lowest discontinuation rates in both bio-naïve (21% and 22%, respectively) and bio-experienced patients (14% and 15%, respectively) (Fig. 4).



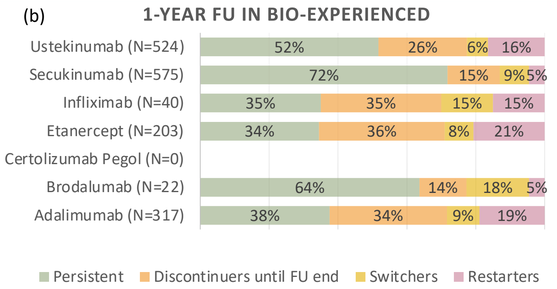


Figure 4 Persistent patients, discontinuers until FU end, switchers and restarters by index drug at 1-year FU in (a) Bio-Naïve and (b) in Bio-experienced

Cost of biologics

- 1-year and 2-year cost per patient was higher in bio-naïve compared to bio-experienced ($p<0.001$ for both].

For **bio-naïve** patients, the mean cost in the 1st and 2nd year of FU was €8,404 (95% CI: €8,293 – €8,510) and €13,899 (95% CI: €13,690 – €14,095), respectively. (Fig.5a; Fig. 6a)

- **At 1-year FU**, switchers (€9,907) and persistent patients (€9,898) had similar cost ($p>0.05$), higher than those of restarters (€6,309) and discontinuers until the FU end (€5,153). However, in those initially treated with adalimumab, etanercept or ustekinumab, persistent patients had lower cost than switchers.
- **At 2-year FU**, persistent patients had higher cost (€17,886), than switchers (€15,881, $p<0.05$), influenced by the difference observed in those initially treated with secukinumab. Discontinuers until the FU end had the lowest cost (€7,930). In those initially treated with adalimumab or etanercept, persistent patients had lower cost than switchers.

For **bio-experienced** patients, the mean cost in the 1st and 2nd year of FU was €7,253 (95% CI: €7,085 – €7,436) and €12,400 (95% CI: €12,106 – €12,722), respectively. (Fig.5b; Fig. 6b)

- **At 1-year FU**, switchers (€9,467), and persistent patients (€ 9,042) had similar cost ($p>0.05$), higher than those of restarters (€8,035) and discontinuers until the FU end (€4,265). Persistent patients initially treated with adalimumab had lower cost than switchers, while among those initially treated with secukinumab, switchers incurred higher costs than persistent patients.
- **At 2-year FU**, persistent patients (€16,816) and switchers (€15,747) had similar cost ($p>0.05$), higher than those of restarters (8,035) and discontinuers until the FU end (€7,390). Persistent patients initially treated with secukinumab had higher cost than switchers.

Figure 5 One-year cost per patient of biologics in (a) bio-naïve and in (b) bio-experienced patients

Note: Significant differences were observed between treatments ($p<0.001$; $p<0.05$ for pairwise comparisons with Bonferroni correction): **Adalimumab**: Lower cost compared to Brodalumab, Secukinumab, Ustekinumab for both. **Brodalumab**: Higher cost compared to Adalimumab, Etanercept, Infliximab for both; lower compared to Secukinumab for both. **Etanercept**: Lower cost compared to Secukinumab, Ustekinumab for both and to Brodalumab for Bio-experienced. **Infliximab**: Lower cost compared to Secukinumab for both and to Brodalumab for Bio-experienced. **Secukinumab**: Higher cost compared to Adalimumab, Etanercept, Infliximab, Ustekinumab for both and to Brodalumab for Bio-Naive. **Ustekinumab**: Higher cost compared to Adalimumab, Etanercept for both and to Infliximab for bio-experienced; lower compared to Ustekinumab for bio-experienced.

Figure 6 Two-year cost per patient of biologics in (a) bio-naïve and in (b) bio-experienced patients

Note: Significant differences were observed between treatments ($p<0.001$; $p<0.05$ for pairwise comparisons with Bonferroni correction): **Adalimumab**: Lower cost compared to Brodalumab, Secukinumab, Ustekinumab for both. **Brodalumab**: Higher cost compared to Adalimumab, Etanercept, Infliximab for both and to Ustekinumab for bio-naïve; lower compared to Secukinumab for bio-naïve. **Etanercept**: Lower cost compared to Secukinumab, Ustekinumab for both and to Brodalumab for Bio-experienced. **Infliximab**: Lower cost compared to Secukinumab for both and to Brodalumab for Bio-experienced. **Secukinumab**: Higher cost compared to Adalimumab, Etanercept, Infliximab for both and to Brodalumab and Ustekinumab for Bio-Naïve. **Ustekinumab**: Higher cost compared to Adalimumab for both and to Etanercept for bio-naïve.

CONCLUSIONS

- Costs differ between those patients with and without biologic experience and persistence rates have been found to be higher in the former group. Early anti-IL therapy shows potential in quickly reducing psoriasis severity and may contribute to disease modification, though more research is needed.[1-3]
- Switchers and persistent patients incurred the highest costs, with notable variation across biologic treatments; secukinumab and brodalumab had the highest persistence and lowest discontinuation rates.
- This study highlights significant cost variability in biologics for PsO, shaped by drug choice, persistence, and treatment history, underscoring the need to balance clinical efficacy[4,5] and economic impact in treatment decisions for PsO, ensuring effective care while managing healthcare resources efficiently.

Limitations: As data capture ended in 2020, costs of newer agents (ixekizumab, bimekizumab, risankizumab) are excluded, though recent literature indicates higher costs for these.[6] Two-thirds of patients had comorbidities, yet the associated costs are not reflected in our results.

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